McGINNIS LAKE MANAGEMENT PLAN

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INTRODUCTION

Chapter 92 of the Wisconsin State Statutes established the Adams County Land and Water Conservation Committee (LWCC) and the Adams County Land and Water Conservation Department (LWCD). The LWCC and LWCD have the responsibility of conserving long-term soil productivity, protecting the quality of related natural resources, enhancing water quality and focusing on severe soil erosion problems.

The McGinnis Lake Association was formed in 1982 to monitor lake water quality and implement best management practices to maintain and improve lake water quality and quantity on McGinnis Lake.

The Wisconsin Department of Natural Resources (WDNR) is dedicated to the preservation, protection, effective management, and maintenance of Wisconsin's natural resources. It is responsible for implementing the laws of the state and where applicable, the laws of the federal government that protect and enhance the natural resources of our state.

To achieve the purposes of the McGinnis Lake Association, Adams LWCC/LWCD and the WDNR, a Lake Management Plan was developed. The plan addresses natural resource issues of the lake and also in the lake's watershed. The plan is dynamic and revisions will occur annually or as needed to reflect current events and priorities. The McGinnis Lake Association will gather formal public input on the plan at it's annual fall meeting. The McGinnis Lake Association will publicly notify all members of the association and the public of the meeting by placing a notice in the local newspaper, Rural Rambler. The McGinnis Lake Association will accept written comments from the members and the public who cannot attend. The plan will utilize best management practices, education, and regulations to improve the natural resources. The plan will incorporate human conveniences in a manner that does not compromise the quality and quantity of the natural resources. All ordinances, policies, and activities associated with the State, County, and Town must receive approval from proper authorities.

The plan consists of goals and action items to address natural resource issues and activities for a five-year period. As one year passes, another year of the plan will be added so the plan will always reflect a five-year period. Scientific studies, community residents, and the general public were inventoried to determine the goals of the plan. A Lake Advisory Group (LAG) was formed to identify action items, write the rough draft of the Lake Management Plan, and present the final plan to the McGinnis Lake Association Board. The McGinnis LAG is responsible for implementing and updating/revising the McGinnis Lake Management Plan. The McGinnis LAG consists of representatives of lake residents, the Town of New Chester, WDNR, watershed residents and the Adams County Board. The LAG shall have a chairperson elected by the members within the LAG. The chairperson shall coordinate LAG activities and provide a report to the McGinnis Lake Association Board as requested.

Copies of the McGinnis Lake Management plan have been distributed and are available at the following locations: McGinnis Lake Association; Town of New Chester; WDNR Service Center in Wisconsin Rapids; Adams Public Library; and Adams Land and Water Conservation Department.

McGinnis Lake Advisory Group

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EXECUTIVE SUMMARY

McGinnis Lake is a 33 acre, hard-water lake in Adams County, Wisconsin that was the focus of this study to investigate surface water quality, groundwater flow, aquatic plants and algae in the lake. This study was designed to help better understand and manage lake water quality in the future.

McGinnis Lake exhibited symptoms of nutrient enrichment. The lake could be classified as moderately eutrophic, and increasing levels of nutrients were measured in the water during the growing season. This increase appears to be linked to the die-back of the dominant aquatic plan, curly-leaf pondweed (*Potamogeton crispus*) during the summer.

The north and the south lobe of the lake are different. The south lobe remained mixed or was partially stratified for short time periods, while the north lobe stratified with a pronounced thermocline and cooler hypolimnion (bottom). Dissolved oxygen (DO) in the north lobe increased in the metalimnion in the beginning of the season likely in response to algae in the water column. In the deeper depths of the north lobe, DO concentrations decreased and were very low at the bottom.

McGinnis is a phosphorus-limited lake, meaning that contributions of phosphorus to the system may increase algae or plant growth. The surface total phosphorus concentration (TP) in the north lobe averaged 23 µg/L and was much higher in the oxygen-depleted hypolimnion. The average TP in the south lobe was 29 µg/L and the outflow averaged 37 µg/L TP. Soluble reactive phosphorus (SRP) was quite low in the upper layers of the lake (north and south) with average concentrations were between 5 to 7 µg/L. The hypolimnion of the north lobe had an average SRP concentration of 128 µg/L.

Clarity was low in the lake. The north lobe had an average Secchi depth measurement of 3.6 feet and the south lobe had an average of 5.2 feet. The south lobe water clarity declined substantially by late July, most likely corresponding to the increase in algae growth stimulated by the release of nutrients from the curly-leaf pondweed. Chlorophyll *a* was also higher during late July.

The groundwater entering McGinnis Lake is a source of calcium and carbonate to the lake. McGinnis is considered a hardwater lake with an average total hardness concentration of 125 mg/L as $CaCO_3$ in the epilimnion. Solid calcium carbonate (marl) forms in the lake. This is evident from the reduction in calcium and carbonate concentrations during the growing season in the north lobe. Settling calcium carbonate may also dissolve in the deeper portions of the lake, based on the increased total hardness and alkalinity concentrations in the north hypolimnion were 231 and 242 mg/L as $CaCO_3$, respectively. The composite total hardness and alkalinity average concentrations in the south lobe were 112 and 111 mg/L as $CaCO_3$, respectively.

Generally, water in marl-forming lakes is expected to be low in phosphorus due to binding with calcium carbonate. In the case of McGinnis Lake, this binding may not be sufficient to prevent eutrophic conditions because much of the marl formation occurs in the north lobe and phosphorus release from the curly-leaf pondweed occurs in the south lobe. In June, curly-leaf pondweed comprised the major plant type in the south lobe and channel and was also found in the littoral zone of the north lobe. Curly-leaf pondweed has a unique life cycle that allows it to out-compete native vegetation because it is tolerant of cold-water conditions and is usually the first plant species in the spring. A survey of the curly-leaf pondweed was conducted in June, just prior to its die-back. The estimated total biomass was 1,800 kg (3,970 pounds) of which approximately 4 kg (8.8 pounds) is estimated to be phosphorus. The nitrogen in the plant tissue was estimated to be 40 kg (88 pounds).

Phosphorus and the algal community increased in the south lobe following the die back of the curly-leaf pondweed. Chlorophyll *a* increased in the south lobe with a maximum on the July 10 sampling date. Water clarity was also lower in July than in June. The dissolved oxygen (DO) in the south lobe also decreased following the die back, likely reflecting organic matter decomposition.

Shallow groundwater was sampled to determine the areas of groundwater inflow and outflow as well as the quality of the groundwater discharging to McGinnis Lake. Generally, nitrate was entering at the strongest inflow sites in the northwest corner of the north lobe. Much of this groundwater likely originated further out into the watershed. Ammonium was present sporadically in groundwater around the lake, but had highest

concentrations along the southern edge of the south lobe. SRP was also high along the southern edge as well as other areas of the lake. Eighteen of the 28 (64%) samples sites had elevated SRP concentrations.

Groundwater from two locations of strong inflow in the north lobe was analyzed at various depths. SRP concentrations ranged from 5 to 13 µg/L, nitrate ranged from 0.40 to 1.82 mg/L, ammonium was less than 0.01 mg/L in all sites, alkalinity ranged from 130 to 175 mg/L as $CaCO_3$, total hardness ranged from 140 to 180 mg/L as $CaCO_3$, and chloride ranged from 0.5 to 2.5 mg/L. Variations in the deep groundwater quality indicate some human influence from land use practices in the groundwater watershed.

This study was conducted as a cooperative effort between the Center for Watershed Science and Education and the Department of Biology at UW-Stevens Point, the Army Corp of Engineers Eau Galle Aquatic Ecology Lab, Wisconsin Department of Natural Resources, McGinnis Lake Association, the Town of Chester, and Adams County Land Conservation Department.

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Aquatic Species Management			
	Develop a secure funding source for managing aquatic species		
	1. Form a lake district	McGinnis LAG	2007
	Machine harvest aquatic plants to improve water quality, to provide safe boating areas, control invasive species and to improve aquatic habitat.		
	1. No harvesting in areas less than 5 feet deep except a 30 foot wide area may be hand harvested. Machine harvest of nuisance level plants will occur in June and August. No critical habitat will be harvested. A map showing areas to be harvested will be utilized. See Appendix A.	McGinnis Lake Assoc Private Contractor	2007 to 2012
	Monitor the harvesting of aquatic plants		
	1. WDNR representative and a McGinnis Lake Assoc. representative will together annually inspect harvesting operations.	WDNR McGinnis Lake Assoc	2007-2012
	2. Record the pounds of mechanically harvested aquatic plants by taking an average weight of a trailer full of plants harvested and multiplying this by the number of trailer loads. This will be documented and reported to WDNR Aquatic Plant Specialist by 12/31 of each year.	McGinnis Lake Assoc	2007-2012
	3. Wet tissues samples will be randomly taken from harvested plants and sent to a certified lab to measure the phosphorus content. This is done to determine the amount of phosphorus being removed from the lakes by harvesting plants.	McGinnis Lake Assoc	2007-2012

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Aquatic Species Management	**Control invasive species utilizing education, monitoring, identification and chemical treatments.**		
	1. Develop a group of volunteers to monitor lake for invasive species.	McGinnis Lake Assoc	2008
	2. Educate volunteer monitor group on invasive species	Adams LWCD	2008
	3. Visually monitor lake for invasive species and plot the locations on a lake map. Areas of Curlyleaf pondweed will be identified and mapped in June of each year.	McGinnis Lake Assoc	2008-2012
	4. Maintain or install edcuational signs about exotic species at boat landing.	McGinnis Lake Assoc	2007 - 2012
	5. Develop a "Clean Boats, Clean Water" program.	McGinnis Lake Assoc Adams LWCD	2008
	6. Treat Curlyleaf pondweed with chemicals specific for the species. Areas of the lake containing Curlyleaf pondweed will be sprayed soon after ice out and during optimal water temperature.	McGinnis Lake Assoc private contractor	2007-2010
	Protect critical habitat areas within the lake		
	1. Educate lake residents about critical habitat areas within the lake by presenting information at an annual meeting	Adams LWCD WDNR	2007
	2. Continue to enforce ordinance that allows no gas motors.	McGinnis Lake Assoc	2007-2012
	3. Avoid mechanical harvesting in critical habitat areas and only use chemicals in . critical habitat areas to control invasive species.	McGinnis Lake Assoc	2007-2012

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Dam			
	Maintain and operate McGinnis Dam to: insure public safety, proper dam function and a stable lake level.		
	1. Conduct annual inspections and record findings as specified in WDNR standards	engineer certified by Nat'l Assoc. of Prof. Eng. Adams LWCD	annually
	2. Operate, inspect, and repair dam to meet Wisconsin laws in Chapter 31 and NR Chapter 330.	Adams LWCD and dam lessee	daily
	3. Develop an Emergency Action Plan	Adams LWCD	2008
	4. Investigate feasibility of generating sufficient electricity at dam to operate lake aerators.	Adams LWCD	2008

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Recreational Uses	**Maintain bluegill, black crappie, yellow perch, northern pike, and largemouth bass fisheries.**		
	1. Stock fish as funding allows based on recommendations from fisheries biologists.	McGinnis Lake Assoc.	2007 - 2012
	2. Explore & make recommendations to WDNR to establish new regulation to increase bass size limit to 18 inches.	McGinnis Lake Assoc.	2007 - 2012
	3. Develop a plan with WDNR Fisheries Biologist to increase fish habitat.	McGinnis Lake Assoc.	2009
	4. Conduct a fish survey to evaluate fishery.	WDNR	2010
	5. Operate & maintain aireators to prevent winter fish kills	McGinnis Lake Assoc.	2007 - 2012
	Maintain recreational opportunities while maintaining peace and solitude		
	1. Continue to implement no gas motors ordinance by turning violators in to WDNR	McGinnis Lake Assoc. and lake residents	2007 - 2012
	Incorporate the goals of the general public into the lake mangement plan.		
	1. Conduct public users survey to identify important management issues. Surveys and dropboxes will be located at boat launches for one year.	McGinnis Lake Assoc.	2007

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Shorelands - area within 1000 feet of the lake.	**Reduce nutrients entering the lake from residential and transportation activities near the lake.**		
	1. Contact property owners identified in shoreline inventory as having erosion, no buffers &/or no storm water runoff mgmt & educate & offer plan/design assistance.	Adams LWCD	2008
	2. Pursue DNR Lake Protection Grant to assist with costs for installing shoreline protection, riparian buffers, storm water runoff , & demonstration buffer site.	Adams LWCD McGinnis Lake Assoc.	2008
	3. Develop a informational packet regarding lake laws & best management practices. and provide 100 copies to McGinnis LAG	Adams LWCD	2007
	4. Distribute informational packet to area realtors, existing and new property owners	McGinnis LAG	2007-2012
	5. Continue to enforce Adams County Shoreland Protection Ordinace	Adams P & Z	2007-2012
	6. Distribute a letter to all lake residents asking them to voluntarily comply with COMM83 (inspect and pump septic systems once every three years). Letter to be included in annual meeting notice.	McGinnis LAG	annually
	7. Restore and maintain riparian buffer at public park located by boat launch.	Adams LWCD and Adams Parks Dept.	2007

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Water Quality	**Maintain present water quality and prevent algae blooms**		
	1. Monitor water quality to measure The lake will be sampled yearly and tested for clarity, chlorophyll a, & total phosphorus and compare to 2003-2006 water quality data.	Adams LWCD McGinnis LAG	2007-2012
	2. Harvest plants from lake to prevent plant decay & release of nutirents	McGinnis Lake Assoc	2007-2012
	3. Install barley bundles under every dock on the lake.	lake residents	annually
	4. Investigate using alum treatment and present findings to WDNR Lake Specialist	McGinnis LAG	2010
	Educate community and public about ways to improve water quality.		
	1. Maintain informational signs regarding best management practices at public boat launch site to educate lake users	McGinnis LAG	annually
	2. Contact local schools & ask if they want to participate in lake mgmt activities	McGinnis LAG	2011
	Practice proper land use utilizing Comprehensive Plans and Zoning		
	1. Within the McGinnis Lake watershed, develop and implement smart growth plans that insures environmental protection in areas being developed.	Town of New Chester Adams P & Z	2007

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Water Quantity			
	Maintain lake levels that enhance water quality and meet the requirements of Wisconsin Statute Chapter 31.		
	1. Operate dam to maintain lake levels and outflows as stated by WDNR.	Adams LWCD	annually
	2. Install a visible lake level gauge.	Adams LWCD	2007
	Maintain stable stream flow out of the McGinnis Lake.		
	1. Operate dams in a proactive manner so large quantities of water are not released causing downstream flooding and streambank erosion. Lake levels will be lowered in a slow consistent manner to accommodate anticipated heavy rains and/or snowmelt runoff.	Adams LWCD	annually
	Deepen the southeast lobe of the lake		
	1. Investigate dredging and report findings to the McGinnis Lake Association	McGinnis LAG	2008

ITEM	GOALS and ACTION ITEMS	WHO	WHEN
Watershed - land outside of shoreland area	**Reduce watershed impacts on groundwater.**		
	1. Implement State Agricultural Performance Standards by inventoring watershed and documenting: runoff from livestock confinement operations entering surface waters; livestock direct access sites; uncontained livestock manure storage facilities; soil erosion sites, and producers not implementing nutrient management plans and irrigation water management plans. Offer County, State, Federal cost share assistance and plan/design assistance to landowners identified in inventory so best management practices are installed for compliance with the State Agricultural Performance Standards.	Adams LWCD, NRCS DNR, Agric. Producers private organizations	2007 to 2012

APPENDI

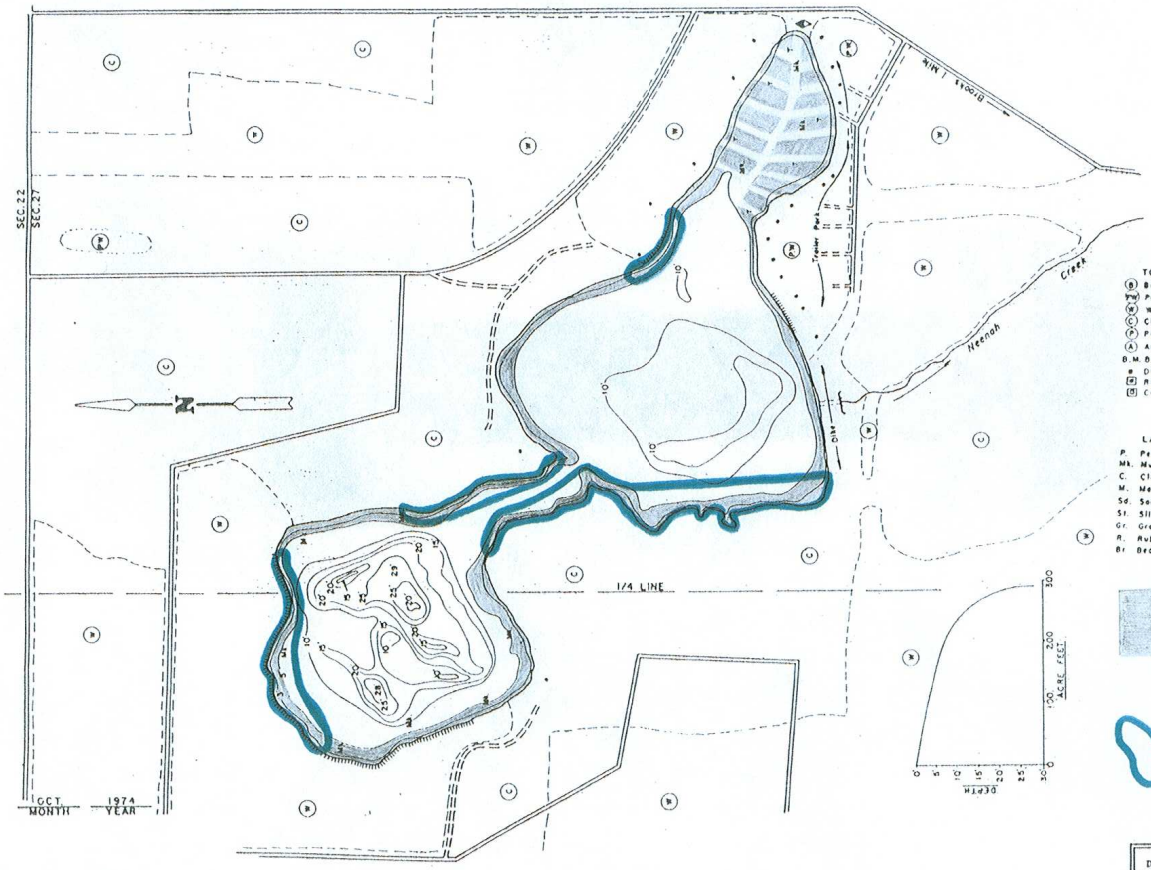
LAKE SURVEY MAP

Scale - 1" equals 200 ft.

MCGIN[illegible]S LAKE

SECTION - 27
TOWNSHIP 16N
RANGE 7E
ADAMS COUNTY

AREA ACRES - 32.68
MAX DEPTH - 28 FT.
TOTAL SHORELINE - 1.48 MI
VOLUME - 288.3 ACRE FT.
MAIN SHORELINE - 1.48 MI
ISLAND SHORELINE - 0 MI



SPECIES OF FISH

	Abundant	Common	Present
Muskie			
N. Pike			
Walleye			
L.M. Bass		X	
S.M. Bass			
Panfish		X	
Trout			

TOPOGRAPHIC SYMBOLS

- (B) Brush
- (PW) Partially wooded
- (W) Wooded
- (C) Cleared
- (P) Pastured
- (A) Agricultural
- B.M. Bench Mark
- Dwelling
- (R) Resort
- (C) Camp
- Steep slope
- Indefinite shoreline
- Marsh
- Spring
- Intermittent stream
- Permanent inlet
- Permanent outlet
- Dam
- D.N.R. State owned land

LAKE BOTTOM SYMBOLS

- P. Peat
- Mk. Muck
- C. Clay
- M. Marl
- Sd. Sand
- Si. Silt
- Gr. Gravel
- R. Rubble
- Br Bedrock
- B Boulders
- Stumps & Snags
- Rock danger to navigatio
- T Submergent vegetation
- Emergent vegetation
- Floating vegetation
- Brush shelters

- NO HARVEST AREA

- NO HARVEST - CRITICAL HABITAT AREA

DATE - OCTOBER 1974

TRACED BY - G. THUESEN

APPENDIX G

PUBLIC COMMENTS ON PROPOSED PLAN AND LAKE ADVISORY GROUP RESPONSES

Harvesting may be solution to problems. It's certainly worth a try. Spraying has been no help lately.
LAG Response: An integrated aquatic plant control program is listed on pages 8-9 and should provide effective control of plant growth.

Would dredging be considered in south lobe of lake?
LAG Response: Yes. A goal to deepen the south lobe and an action item to investigate dredging was added to the plan on page 13.

Since McGinnis Lake is start of Neenah Creek, why is McGinnis Lake not more important Adams LWCD and WDNR?
LAG Response: McGinnis Lake is important to Adams LWCD and WDNR and an example is their assistance to McGinnis Lake Association with the lake management plan.

We have had an expensive study done by the DNR to tell us the problems and what could be done to correct them. As far as I'm concerned nothing has really been solved.
LAG Response: Group acknowledged concern. Planning process should be given a chance to work.

DNR has conflicting opinions regarding if we need an aeration system.
LAG Response: Group is communicating with WDNR to clearly define the need.

One of my concerns is all the chemicals farmers put on fields to make crops grow. With rain and irrigation systems, some of these chemicals are getting into ground water springs that feed this lake.
LAG Response: Watershed section of lake management plan, page 14, addresses this concern.

Your map on irrigation does not show all irrigation that is going on. It only shows up by Grand Marsh, when there are actually many more areas.
LAG Response: The ground water watershed map was developed by UW-Stevens Point Assistant Professor of Water Resources, Paul McGinley. Recognizing the map is an estimate, the group recognizes the map was developed utilizing the best available technology.

I can't see weed harvesting. The area that needs it the most is by the public boat landing, but it can't be done because it is too shallow. It's like mowing your lawn, it comes back. Spraying kills weeds.
LAG Response: An integrated aquatic plant control program is listed on pages 8-9 and should provide effective control of plant growth. Also changed harvest map to allow harvesting channels in south lobe.

Plan must be presented and approved by lake association prior to any implementation of plan.
LAG Response: Group is aware of this and will present plan for association approval at spring meeting.

Why does the lake association have to pay DNR so much an acre to spray the lake which is owned by the state? DNR should be making a contribution to the lake association for taking care of their lake.
LAG Response: WDNR provides grants for the implementation of best management practices.

We asked for new boat landing like other lakes, but have never gotten one.
LAG Response: Group discussed item and decided not to pursue at this time.

Thank you McGinnis Lake Advisory Group/DNR for scrutinizing attention you have been providing.
LAG Response: It is nice to hear positive feedback.

The natural flora of area is superior to finely manicured lawns that contribute fertilizers to the lake.
LAG Response: Shorelands section of plan, page 11, agrees with this comment.